

CLAIMS

What is claimed is:

- 1 1. A projection engine comprising:  
2 a first micro mirror having a first tilt axis disposed on a first plane;  
3 a plurality of light sources optically coupled to the first micro mirror, and  
4 disposed along a light source axis disposed on a second plane, where the light  
5 source axis disposed on the second plane is parallel to the first tilt axis disposed on  
6 the first plane.
- 1 2. The projection engine of claim 1, wherein the light sources illuminate with  
2 illumination cone angles that are expanded in a direction paralleling the first tilt axis.
- 1 3. The projection engine of claim 1, wherein the light sources are primary color  
2 light sources comprising at least two of a red color light source, a blue color light  
3 source, and a green color light source.
- 1 4. The projection engine of claim 1, wherein the light sources comprise at least  
2 one solid state light source.
- 1 5. The projection engine of claim 4, wherein the at least one solid state light  
2 source comprises at least a selected one of a light emitting diode and a laser diode.
- 1 6. The projection engine of claim 1, wherein the projection engine comprises a  
2 micro mirror device having a plurality of micro mirrors including the first micro mirror  
3 and a second micro mirror having the same first tilt axis.

- 1 7. The projection engine of claim 1, wherein the projection engine comprises a  
2 micro mirror device having a plurality of micro mirrors including the first micro mirror  
3 and a second micro mirror having a second tilt axis disposed in the first plane, where  
4 the light source axis is also parallel to the second tilt axis.
- 1 8. The projection engine of claim 1, wherein the light sources are optically  
2 coupled to the first micro mirror in a non-orthogonal angular manner.
- 1 9. The projection engine of claim 1, wherein the light sources directly project  
2 onto the first micro mirror.
- 1 10. The projection engine of claim 1, wherein the first tilt axis is a diagonal tilt  
2 axis.
- 1 11. The projection engine of claim 1, wherein the first tilt axis is a selected one of  
2 a horizontal tilt axis and a vertical tilt axis.
- 1 12. A projection system comprising:  
2 a projection lens;  
3 a plurality of micro mirrors having a plurality of parallel tilt axes disposed on a  
4 first plane; and  
5 a plurality of light sources optically coupled to the projection lens through the  
6 micro mirror device, and disposed along a light source axis disposed on a second  
7 plane, where the light source axis is parallel to the tilt axes.

1 13. The projection system of claim 12, wherein the plurality of light sources  
2 illuminate with illumination cone angles that are expanded in a direction paralleling  
3 the tilt axes.

1 14. The projection system of claim 12, wherein the plurality of light sources  
2 comprise at least two of a red color light source, a blue color light source, and a  
3 green color light source.

1 15. The projection system of claim 12, wherein the plurality of light sources  
2 comprise at least one solid state light source.

1 16. The projection system of claim 15, wherein the at least one solid state light  
2 source comprises at least a selected one of a light emitting diode and a laser diode.

1 17. The projection system of claim 12, wherein the plurality of light sources are  
2 optically coupled to the micro mirror device in a non-orthogonal angular manner.

1 18. The projection system of claim 12, wherein the plurality of light sources  
2 directly project onto the micro mirrors.

1 19. The projection system of claim 12, wherein the projection system further  
2 comprises  
3 a processor coupled to the micro mirrors and the light sources to control the  
4 micro mirrors and the light sources to project an image; and  
5 a digital input interface coupled to the processor to facilitate input to the  
6 processor pixel data of the image in digital form.

1 20. The projection system of claim 19, wherein the projection system further  
2 comprises a television tuner.

1 21. The projection system of claim 12, wherein at least one of the tilt axes is a  
2 diagonal tilt axis.

1 22. The projection system of claim 12, wherein at least one of the first tilt axes is  
2 a selected one of a horizontal tilt axis and a vertical tilt axis.

1 23. In a projection apparatus, a method of operation comprising:  
2 controlling a plurality of light sources disposed on a light source axis disposed  
3 on a first plane to selectively emit lights; and  
4 controlling a plurality of micro mirrors optically coupled to the light sources to  
5 selectively tilt relative to a plurality of tilt axes to selectively reflect the lights  
6 selectively emitted by the light sources.

1 24. The method of claim 23, wherein said controlling comprises controlling the  
2 light sources to emit lights with illumination cone angles that are expanded in a  
3 direction paralleling the tilt axes.

1 25. The method of claim 23, wherein the method further comprises  
2 receiving inputs for an image to be projected, in digital form; and  
3 performing both of the controlling based at least in part on the inputs  
4 received.